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3PM

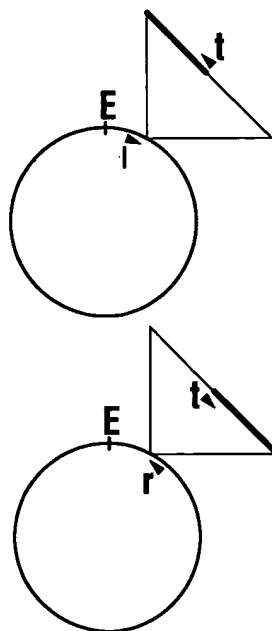


FIGURE 1A

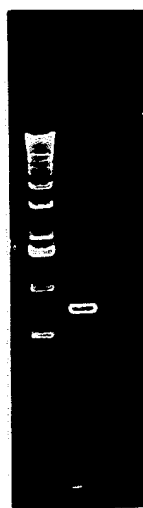


FIGURE 1B

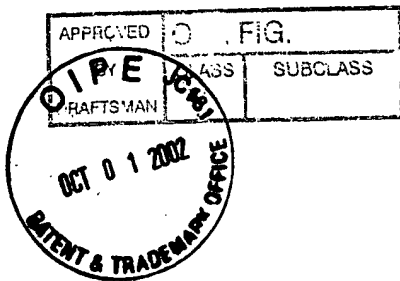
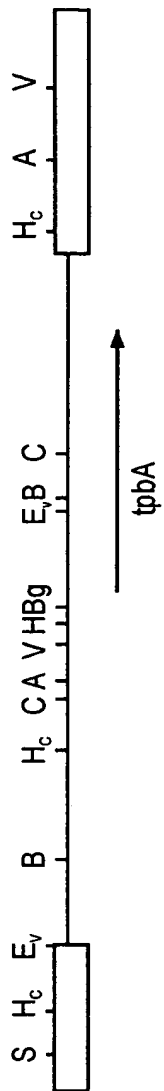
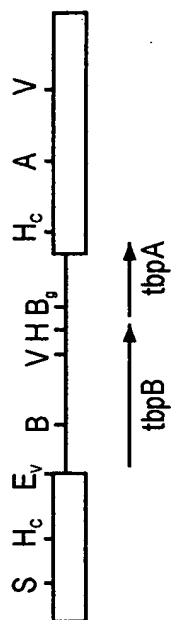


FIGURE 2

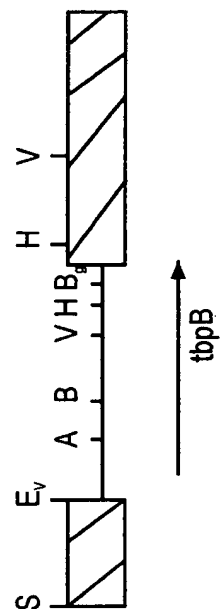
Plasmid 9



Plasmid 10



Plasmid 482



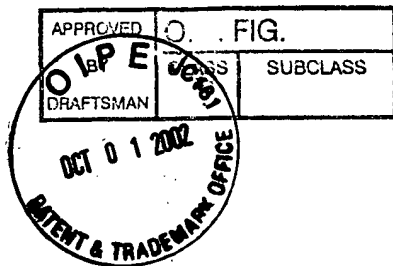


FIGURE 3A

tbpB

10 20 30 40 50
1 CGCTTGCAGA TTTGTAAAAA ATTTAGCTAA AATCAGACCT GGCTTGTATT
51 TTAGGGTTAT TATGGAACAG ACAACGGAAC AAATAGATTA TAAATTATTA
101 AAGCATCGTT TTCGTGGCTA TTTACCGCTT GTGATTGATG TGGAACAGAG
151 GCTTAAATGC CCAAACCTGTG CCTTATTGGA ATTGGCCGGA ATTACTTTAA
201 AATTGGACGA GCCAAGGTTA TCTTATTGCC GGATTCAACA ATGCCAATTT
251 CCAATTTGCG GCCATTGGAG GGGGCGATTT TCAAGGGCCG AATATTTACC
301 CTCAGTCATT AAAATTCAAC GGCATTCATA TTCACAACCC TCTAGAGGAA
351 GCGGTTTAGA GAATATTGCC CAATTCCCGG AAATGTTCAA AATGGTTCGC
401 AAAGCAATGA AGGAAGCAAG GCTGCCAACG GGCGGTGATT GTTGCCCCAC
451 AATGCCAGCG TTCGATCAGG GCTTTTTTAC AGGGCTGCGA TTAAACGGAA
501 TGCCAAGCGA GAGATCCCTT TCACCCTTTT GGCGATGTTT GACTACCGCC
551 GCCACCCTTT GCAGGTTTTA TGTTATGGGC AAACCGTGTT CGTTAAAAGC
601 CTGCCAGTGC AAAATCCGTT CACGTAGCAG CACTATAGGG CGAATTGGGT
651 ACCGGGCCCC CCTCGAGGTC GACGGTATCG ATAAAGCTTC ATATCGAATT
701 CCTGCAGCCC GGGGGATCCG ATGCGCCTTG CGGCTCAAGT TATTAGTGGC
751 ATCGGTTTTT TGGGTGATGG TGTCATTTTG CATAAGAAAA ATGATGCGAT
801 TTCAGGTTTA CCCACTGCGG CGATTATTTG GGCTTCTGCG GGGATCGGTA
851 TTGCTGCAGG GGAGGGTTTC GTGTTTCATG CGGTCATCGC CACTGTCATT
901 ATTTTGGTGT CTATTCGATT ATGTCCGTTG GTTCAACGTT GGGTTCATCG
951 TAAATCACAA CGTCGTCGAC GAAATATTCT TGTCAATGAT GCGGAAAGCA
1001 TACGGAAAGT TACCCAATTG TTATTCAATA ATCAGTATCG TATTGAACAT
1051 ATACAAGTCA AAGATCAAAG TAGTGGAGAA GTTGCCGGTT ACAAATTCGT

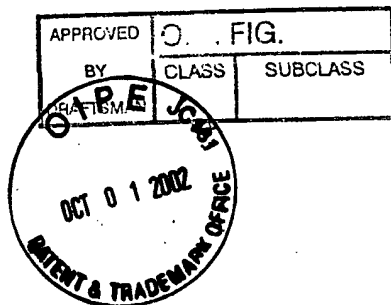


FIGURE 3B

1101 ATTGATTCCA CAATGTTCAA AGATGCGTAT GCTTTACTTA AAGCAGAAGA
1151 TGGCGAATAC TGTTC AAGTA GATATCATGA AAAAGAGTGC TTATATTCAA
1201 TTTTTTATTT TTTATTTAAT TTCTTTCCAC AAAAGATCAT TTTCAATTAT
1251 ATATACTGGA ATTTTGCCTT ACGCTATCTG TCATTTATTA TGCTATTCAA
1301 GCACAACAAA CTATGGAACA ACAATCAAAA TGTACGCTTA TCGGCTGCCG
1351 ATGATTTTGA TAATGATCGA TGTGCAGAAA TATTTGAACT TACGATTTTC
1401 ACTGAGCAGT CAAAGCACGT TCGCGAGTAT CGACTCTACT TTATTTATCG
1451 TTTGTGCACT ATGTATAATC CACCTAATTC CGTGCCTTGG CCATAAAAGC
1501 CCCCTTCAAA TTGTATTTAT ATCAGCTACC GTGCCACCAT TCGTACTTTT
1551 CGGATCAAGA TTAAACAGA ATCCCTGCAT GCACAGCGAA ATCAGCTGCG
1601 GTATGCGAAA CGCCGCAGGA GCGCAGTACG CGAAGTGTAC CGTCACTATC
1651 AGTGCTAGAT TTGTCAATAA AAAATTAGTG ACCAAGCTTG GGTGCATAAT
1701 GATGGTGATG AAAGAACGCT CAATGCTTGA CACGTTGCAG GCTATCTGTA
1751 AGGGTATGGT AGTTACAGGC ACAGCCCAAA CGGCCAATTG CTGGTTTTTT
1801 ATCCTTGATC CGAACAGTAC GAATGGTGGT CACGGTAGTG CATATACATA
1851 CTCAATTGAA GGGGGCTTTT ATGGCCCTAA GGCGACGGAA TTAGGTGGTA
1901 TTGTACATAG TGCAGAAACG GATAAAGATA GAGTCAGTAT TACATTCGGC
1951 GGAAAACGTC AAATAGAAAA ATAATCATAA TTCCCCTTTG CTGGTTGTAG
2001 ATAGCAGCGG GCAATTTTTT ATAAAAATTT GCAAAATTTA AATAA

APPROVED	O. FIG.	
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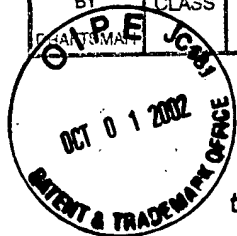


FIGURE 3C

tbpA

```

          10          20          30          40          50
1  AGACCCTATC TAATGATAAT GAAATATCAT CATTTTCGCT ATTCACCTGT
51 TGCCTTAACA GTGTTATTG CTCTTCTCA TTCATACGGT GCTGCGACTG
101 AAAATAAAAA AATCGAAGAA AATAACGATC TAGCTGTTCT GGATGAAGTT
151 ATTGTGACAG AGAGCCATTA TGCTCACGAA CGTCAAAACG AAGTAACTGG
201 CTTGGGGAAA GTAGTGAAAA ATTATCACGA AATGAGTAAA AATCAAATTC
251 TTGGTATTCG TGATTAACT CGCTATGACC CTGGTATTTT GGTGGTGGAA
301 CAAGGTCGCG GTGCAAGTAG TGGCTATGCC ATTCGAGGTG TAGATAAAAA
351 CCGTGTCAGC TTACTTGTTG ATGGGCTACC ACCAGCGCAC AGTTATCATA
401 CGCTGGTTCA GATGCTAATG GTGGTGCAAT TAATGAGATT GAGTATGAAA
451 ACATTCGTTT AATTGAGTTA AGCAAAGGAG CAAGTTCCTGC GGAATATGGC
501 TCTGGTGCGC ATGGTGGTGC TATTGGTTTT CGTACTAAAG ATCGCCAGGA
551 TATTATTAAA GAGGGGCAGC ATTGGGGCTT ACATAGTAAG ACCTCTTATG
601 CCAGCAAAAA TAGCCATTTT TACAGTCTAT CGCAGCGGCT GGTCAAGCGG
651 GTGGTTTTCA AGCACTTGTT ATTGCAACTC ACCGACACGG TAAAGAGACC
701 AAAATTCATT CCGAGGCAAA TCAATTACAT ATTATTCGGC GTATAACCGG
751 CTTTCAAAAT CGCTACGACT TTACCCAATT CCGCACAGAA TGCCTCCTGG
801 AGGATCTTTT TTTATTGTGG AAGATACTTG CCCAACATTA GATTGTACTC
851 CTCGTGCAAG GGTTAAGTTG AACGCGATAA TTTCCAGTC AGAACATTTT
901 CGAATATACG CCTGGAAGAG GCGAAACAGC TTGAGATTCC TTATCGCACT
951 GAGCTCTCAG CCCAAAGAAT ARACCGGTAA AGATCGCATT GCACCAAACC
1001 CTTTAGATTA CAAGAGTAAT TCTGTTTTTA TGAAGTTTGG CTATCACTTT
1051 ACCTCGTCTC ATTATCTTGG CGCATCTCAC AAGATGATAC AAAACAACGC
1101 ACGATATCCG TCATSTGCAA ACGCCAGCTT ACTATACAAA AGACGATATT
1151 TACTTATCAC TTTGGAACTA TGTTTTATCAA GGGGATATTA TTTAGATGGC
1201 TTAGTGTTCA AGCCAAGGAT CCCTTATGGG TTGCGCATAT GCCATGTGAA

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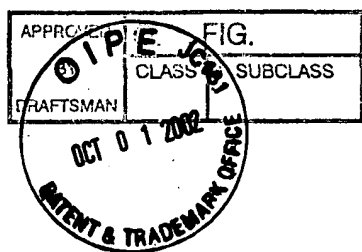


FIGURE 3D

1251 CGTCACCACA AACGTCGTTT AGGATTCACC TATAAATATA AACCAGAGAA
1301 TAATCGCTGG TTGGATAGCA TTAAGTCGTG CGTACGTGCT TTGCGCTCTC
1351 GCTGCTGTGC TCTGAGTAAA CAAGATATTG AACTATATAG CCGGCTACAT
1401 CGCTTGCAAT GTAGCGATTA TCCTGTGSTA GATAAAAATT GCGGCCCCGAC
1451 TTTGGATAAA TCTGGTCTAT GTATCGAACT GAGCGTAATA ATTACCAAGA
1501 AAAGCATCGT GTCATTCATT TAGAATTTGA TAAAGCGCTA AATGCTGGTC
1551 AAGGCGTATT TAAGCAAACC CACAACTGA ATTTAGGCTT GGGCTTTGAA
1601 TCGATTAATC GCTTATGATC ATGGGGATAT GACTGCCCAA TATACCAAAG
1651 GCCGGTTATA CCAGCTACCG CGGAGAGGGG CTTTAGATAA TCCATATATT
1701 TATCGCCGCG ATCCACGCAG TATTGAAACG GTATCTTTGT GTAATAATAC
1751 AGCGGCGACA CTTAACTGTG ACGCGTTAAA TAAAGGCATA CGTTTGTACC
1801 TCCGCTGCAC TTAGGAACTA TAGTTTATGA AGGGGATAAT ATTTAGATGG
1851 CTTAGTGTTT AAGCAAGCAA GGATCCCTTA TGGGTGCGC GATATGCCAT
1901 GTGAAGTTTT TGATGAACGT CACCACAAAC GTCGTTTAGG ATTCACACCT
1951 ATAAATATAT AAACCAGAGA ATAATCGCTG GTTGGATAGC ATTAAGTCGT
2001 GCGTACGTGC TTTGCGCTCT CGCTGCTGTG CTGTGAGTTA AACAAGATAT
2051 TGAAACTTAT AGCCGGCTAC ATCGCTTGCA TTGTGAGCGA TTATCCTGTG
2101 GTAGTAGTAA AAATTGCGGC CCGACTTTGG ATAAATCTTG GTCTATGTAT
2151 CGAACTGAGC GTAATAATTA CCAAGAAAAG CATCGTGTCA TTCATTTAGA
2201 ATTTGATAAA GCGCTAAATG CTGGTCAAGG CGTATTTAAG CAAACCCACA
2251 AACTGAATTT AGGATTGGGC TTTGAATCGA TTAATTCGCT TATGGATCAT
2301 GGGGATATGA CTGCCAATA TACCAAAGGC CGGTATATACC AGCTAACCAG
2351 GAGAGGGCGT TTAGATAATC CATATTTATC GCCGCGATCC ACGCAGTATT
2401 GAAACGGTAT CTTTGTGTAA TAATACACGC GCGACACTAA CTGTGACGCG
2451 TTAAATAAAG GCATACGTTT GTACCTCCGC TGCTGCCTAA TAAATCAAAA
2501 GAATAACCGA GATACGGTTC AGTGTTGTTC CAACCAGTTG CGATGGCCCA

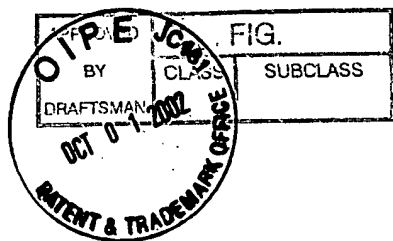


FIGURE 3E

2551 CTACGTGAAC CATCACCTA ATCAAGTTTT TTGGGGTCGA GGTGCCGTAA
2601 AGCACTTAAC CCTTCTGTCG TCTCCCGTGG ATGCTTAAAT TCGCAGCTAG

2651 TGGCAGGCAG GCACGTCCTT CCTCTCGGTG ATTTTCAGGTG CAACTGACCG
2701 GTTCTTGGA CCACCCTTGA TATTAACCGG AGTCAATTAT AAAAACGAGT
2751 TACGTGGAGC GCAATTTATA ATGTCGATGT CAGATACTGT AAAACTCTAT
2801 ATTACCGTGG GCAGCAATTA GGTGACAGGG CCACGGGGCA AGCGAAACCA
2851 GACGGGTACC AATTACACCG ATTTGCCGCC CCCGGGAGAG AAATTTTCAGT
2901 TACCATTCAA AGAAGTTTAG AGCCGGCCAA AAGAAAATAC AAAAAACGCT
2951 GAAAGTATAT TCAGCGCGTT TTTGTTGCTC TAACGGATTA CATACGAATT
3001 CAAAATGTTT TAACGGTCGG TTA

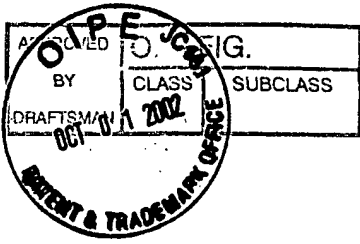


FIGURE 4

CGCTTGCAGATTGTAAAAAATTAGCTAAATCAGACCTGGCTTGTATTTAGGGTTATTAATG
- - - - -
-35 -10 ---
MET
PHTBPB

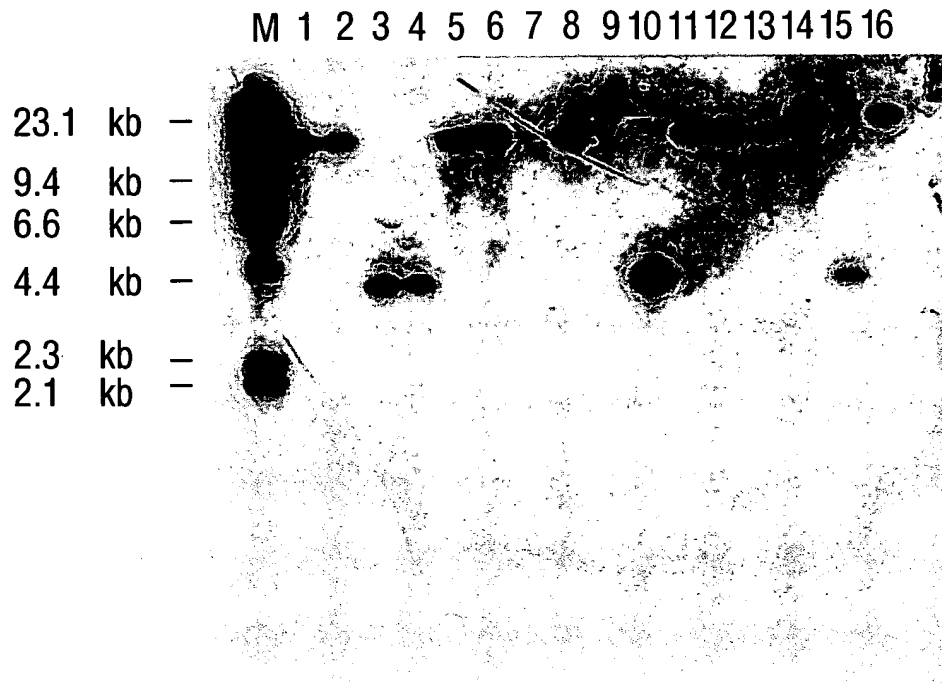
TTTAAAAATAAAATAAATCCTTATCATTCCTTAATTGAATCGGGTTTGTTATG
----- -35 -10 MET

GTATTTGCAAAATTGTTAAAAATAAAATAAATCCCTTATCATTCCTTTAAT	*****	TGAATTGGGTTTATATG	NMTBPB
-----		---	
-35	-10		
		MET	

ADMITTED	FIG.
BY	CLASS
DRAFTSMAN	SUBCLASS

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 OCT 01 2002
 PATENT & TRADEMARK OFFICE

FIGURE 5



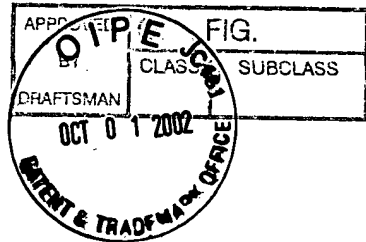
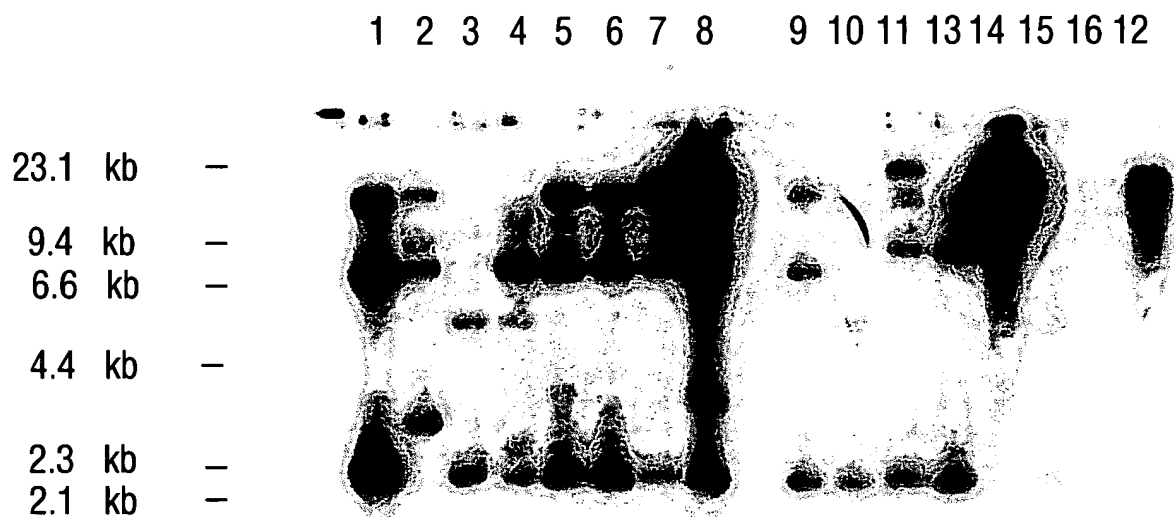


FIGURE 6



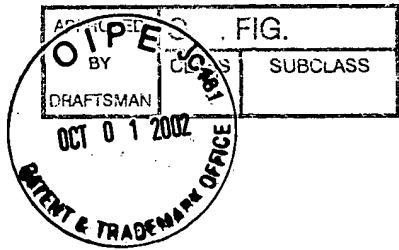


FIGURE 7

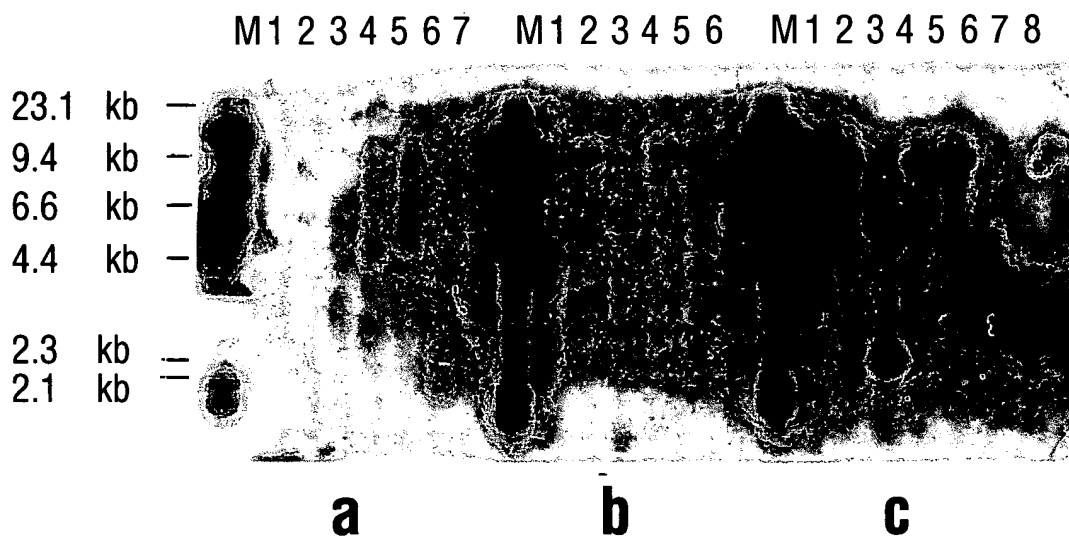
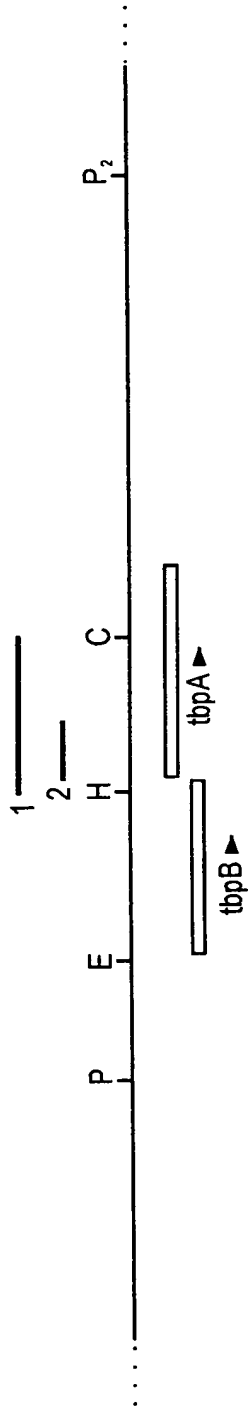
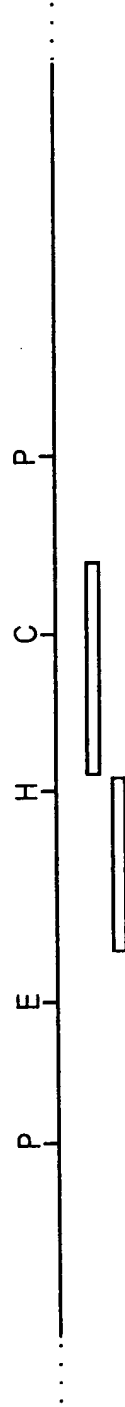


FIGURE 8

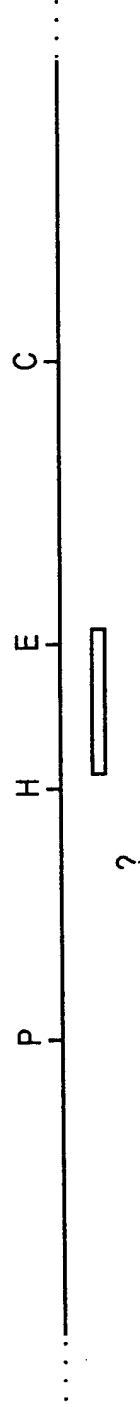
P. haemolytica A1



A. suis 3714



A. pleuropneumoniae CM5, Shope 4074



2kb

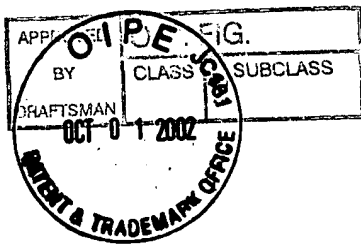


FIGURE 9B

PHTBP	TYKY-KPENNRWLD SINSCVRALRSRCCALSKQDIELYSRLHRLHCS DYP	475
NGTBP1	EYVYTNADKDTWAD----YARL-----SYDRQGIGLDNHFQQTHCSA-D	451
NM1	EYVYHNADKDTWAD----YARL-----SYDRQGIDLDNRLQQTHCSH-D	446
	. * * * * . . . * . . . * * *	
PHTBP	VVDKNCGPTLDKSWSMYRTERNNYQEKHRVHLEFDLALNAGQGVFLQTH	525
NGTBP1	GSDKYCRPSADKPFSYKSDRVIYGESHKLLQAAFKKSFDTAK----IRH	497
NM1	GSDKNCRPDGKNKPYSFYKSDRMIYEESRNLQAVFKKAFDTAK----IRH	492
	** * * * * * * *	
PHTBP	KLNLGLGFESINSLMDHGDMTAQYTLGRLYQL---PRRDPRSIWTVSLCN	572
NGTBP1	NLSVNLGYDRFGSNLRHQDYQQSAN-RAYSLKTPPQNNGKKTSPNGREK	546
NM1	NLSINLGYDRFKSQLSHSDYYLQNAV-QAYDLITPK---KPPFPNGSKD	537
	. * . . . * * * * *	
PHTBP	NT-----RATLNCDAL-NLGIRLYLRCCLINQLNPNRYGSVLFQFGTRV	615
NGTBP1	NPYWVSIGRGNVVTQICLFGNNTYTDCTPRISINGKSYAAV--RDNVRL	594
NM1	NPYRVSIGKTTVNTSPICRFGNNTYTDCTPRNIGNGYAAV--QDNVRL	585
	* * * * *	
PHTBP	HRTWTPTSLGELPSIRAMAHYVNHHPNQVFWGRGAVKHLT-----LLSS	659
NGTBP1	GR-WADVGAG----LRY--DYRSTHSDDGSVSTGTHRTL SWNAGIVLKPA	637
NM1	GR-WADVGAG----IRY--DYRSTHSEDKSVSTGTHRNLSWNAGVVLKPF	628
	* * . . . * * * * *	
PHTBP	PWM-LKFAASG--RHVTL SVISG-ATDRFLVPPLILTGVNYKNES---YV	702
NGTBP1	DWLDLT YRTSTGFRLPSFAEMYGWRSGDKIKAVKIDPEKSFNKEAGIVFK	687
NM1	TWMDLT YRASTGFRLPSFAEMYGW RAGESLKTLDLKPEKSFNREAGIVFK	678
	* . * . . . * * * * *	
PHTBP	SAIYNVDVRYCKTLY-----YRGQQLGDRATGQAKPDGY---QLHRFA	742
NGTBP1	GDFGNLEASWFNNAYRDLIVRGYEAQIKDGKEQVKGNP-AYLNAQSARIT	736
NM1	GDFGNLEASYFNNAYRDLIAFGYETRTQNGQTSASGDP-GYRNAQNARIA	727
	. . . * * * * *	
PHTBP	APG-----RNFSYHSSKKFRPAK---ENTKNAESIFS	770
NGTBP1	GINILGKIDWNGVWDKLPEGWYSTFAYNRVRVRDIKKRADRTDIQSHLFD	786
NM1	GINILGKIDWHGVWGGLPDGLYSTLAYNRIKVKDADIRADRTFVTSYLFD	777
 * * * * *	
PHTBP	A-----FFVGSNGLHTNSKSCFNGLRHEPIPYFFNFLRNVPRFNEYHCCC	815
NGTBP1	AIQPSRYVVGSGYDQPEGKWGVNGMLT-----YSKAKEITELLGSR---	827
NM1	AVQPSRYVLGLGYDHPDGIWGINTMFT-----YSKAKSVDELLGSQ---	818
	* . . . * * * * *	

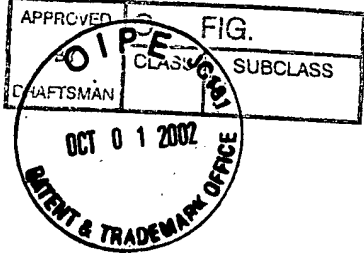


FIGURE 9C

PHTBP	TSLIAASILLHHIYHWVDFRYYYFV--YFCWILHHLIHINSFLMLLSHY	863
NGTBP1	-ALLNGNSRNTKATARRTRPWYIVDVSGYYTVKKHFTLRAGVYNLLNHRY	876
NM1	-ALLNGNANAKKAASRRTRPWYVTDVSGYYNIKKHLTLRAGVYNLLNYRY	867
	. * * * * . * * . *	

PHTBP	--REVVYLTCCACAFNIVTVNGF----CVGCCSNILAEMKF	898
NGTBP1	VTWENVRQTAAGAVNQHKNVGVYNRYAAPGRNYTFSLEMKF	917
NM1	VTWENVRQTAGGAVNQHKNVGVYNRYAAPGRNYTFSLEMKF	908
	. * * * * . . * . . * * * *	

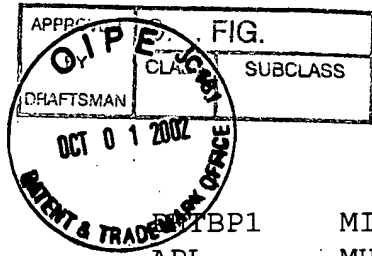


FIGURE 10A

PHTBP1	MIMKYHHFRYSTVALTVLFLALSHSYGAATENKKIEENNDLAVLDEVIVTE	50
APL	MHFKLNPY---ALAFSTLFLVACSGGKGSFD-----LEDVRPNQ	36
APL7	MHFKLNPY---ALAFSTLFLVACSGGKGSFD-----LEDVRPNK	36
	* . * * . * *	
PHTBP1	SHYAHERQNEVTGLGKVVKNYHEMSK--NQILG--IRDLTRYDPGISVVE	96
APL	TAKAEKATTSYQDEETKKKTKEELDKLMEPALGYETQILRRNKAPKTETG	86
APL7	TTGVSKEE--YKDVETAKKEKEQLGELMEPALGYVVKV-----PVSSFE	78
 * *	
PHTBP1	QGRGASSGYAIRGVDKNRVSLLDGLPQAHSYHTLSGDANGGAINETI-EY	145
APL	EKRNER---VVELSEDKITKLYQESVEIIPH--LDELNGKTTSNDVYHS	130
APL7	NKK-----VDISD-----IEVITNGNLDDVPYKANSSK-YN	109
 *	
PHTBP1	ENIRSIELSKGASSAEYGSAGHGAIGFRTKDAQ-DIIKEG-----	185
APL	HDSKRLDKNRDLKYVRSGYVYDGSFNEIRNRDNGFHVFKQGIDGYVYYLG	180
APL7	PDIK--TKDSSLQYVRSGYVIDGEHSGSNEK-----GYVYYKG	145
 *	
PHTBP1	----QHWGLDSKTSYASKNSHFLQIAAAGEAGGFALVIATHRH-----	225
APL	VTPSKELPKGKVISYKGTWDFVSNINLEREIDGFDTSBGDKNVSATSITE	230
APL7	NSPAKELPVNQLLTYTGSDFTSNANLNNE-----EGRPNYLNDDYYTK	189
 *	
PHTBP1	--GKETKI-HSEANKLKHNIIRITGFENRYDFTQIPHRMPPGGSFFIVED	272
APL	TVNRDHKVGEKLGDNVKGVAHSSEFAVDFTDNKKLTGSLYRNG--YINRN	278
APL7	FIGK--RVGLVSGDAKPAKHKYTSQFEVDFATKKMTGKL-----SD	228
 *	
PHTBP1	TCPTLDCTPRARVKLNDRNFPVRTFPEYTPEERNAEQIPYRTEQ--LSAQ	320
APL	KAQEVTKRYSIEADIAGNRFRG-----KAKAEKAGDPIFT-DSNYLEGG	321
APL7	KEKTI---YTVNADIRGNRFTGAATASDKNKGKGESYNFFSADSQSLEGG	275
 *	
PHTBP1	EKTGKDRIAPNPLDYKSNSVFMKFGYHFNSSHLYLGAILEDTKQRTISVIC	370
APL	FYGPKAEMAGKFFTNNKSLFAVFAAKSENGETTTERIIDATKIDLTQFN	371
APL7	FYGPKAEMAGKFVANDKSLFAVFSAKHNGSNVNTVRIIDASKIDLTNFS	325
	. * * *	
PHTBP1	KRQLTI--QKTILTYHLGTMFMKGIIFRWLSVQAKDPLWVAHMPCEVDER	418
APL	AKELNNFGDASVLIIDGQKIDLAGVNFKNKSKTVEINGKTMVAVACCSNLE	421
APL7	ISELNNFGDASVLIIDGKKIKLAGSGFTNKHTIEINGKTMVAVACCSNLE	375
	. * *	

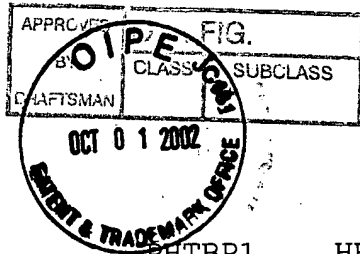


FIGURE 10B

PHTBP1	HHKRRLGFTYKYKPENNRWLDINS CVRALRSRCCALSKQDIELY-----	463
APL	YMK----FGQLWQKEGKQQVKDNSLFLQGERTATDKMPAGGNYKYVGTWD	467
APL7	YMK----FGQLWQQAEGGKPENNSLFLQGERTATDKMPKGGNYKYIGTWD	421
	. * * * . . . *	
PHTBP1	---SRLHRLHCSDYPVVDKNCGPTLDSWSMYRTERNNYQEKATCHSFCI	510
APL	ALVSKGTNWIAEADNNRESGYRTEFDVNFSDKKVNGKLFDKGGVNPVFTV	517
APL7	AQVSKENNWWATADDDRKAGYRTEFDVDFGNKNLSGKLFDKNGVNPVFTV	471
	* * *	
PHTBP1	LKALNAGQGVFKQTHKLNGLGFESNLIRLTIIGIILPNIPKAGYTSYRG	560
APL	DATIN-GNGFIGSAKTSDSGFALDAGSSQHGNVAFSDIKVNGGFYGP--T	564
APL7	DAKID-GNGFTGKAKTSDEGFALDSGSSRYENVKFNDVAVSGGFYGP--T	518
	. . * . * * *	
PHTBP1	RGRLDNPYIYRRDPRSIETVSLCNNTRATLLLLRVNKGIRLLLR 604	
APL	AGELGGQFHHKSDNGSVGAV-----FGAKRQIE---K 593	
APL7	AAELGGQFHHKSENGSVGAV-----FGAKQQVK---K 547	
	. * *	

APPROVED	0 . FIG.
BY	CLASS
DATE	SUBCLASS

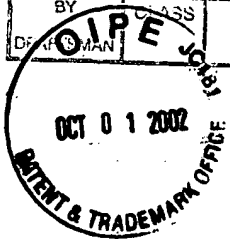


FIGURE 11

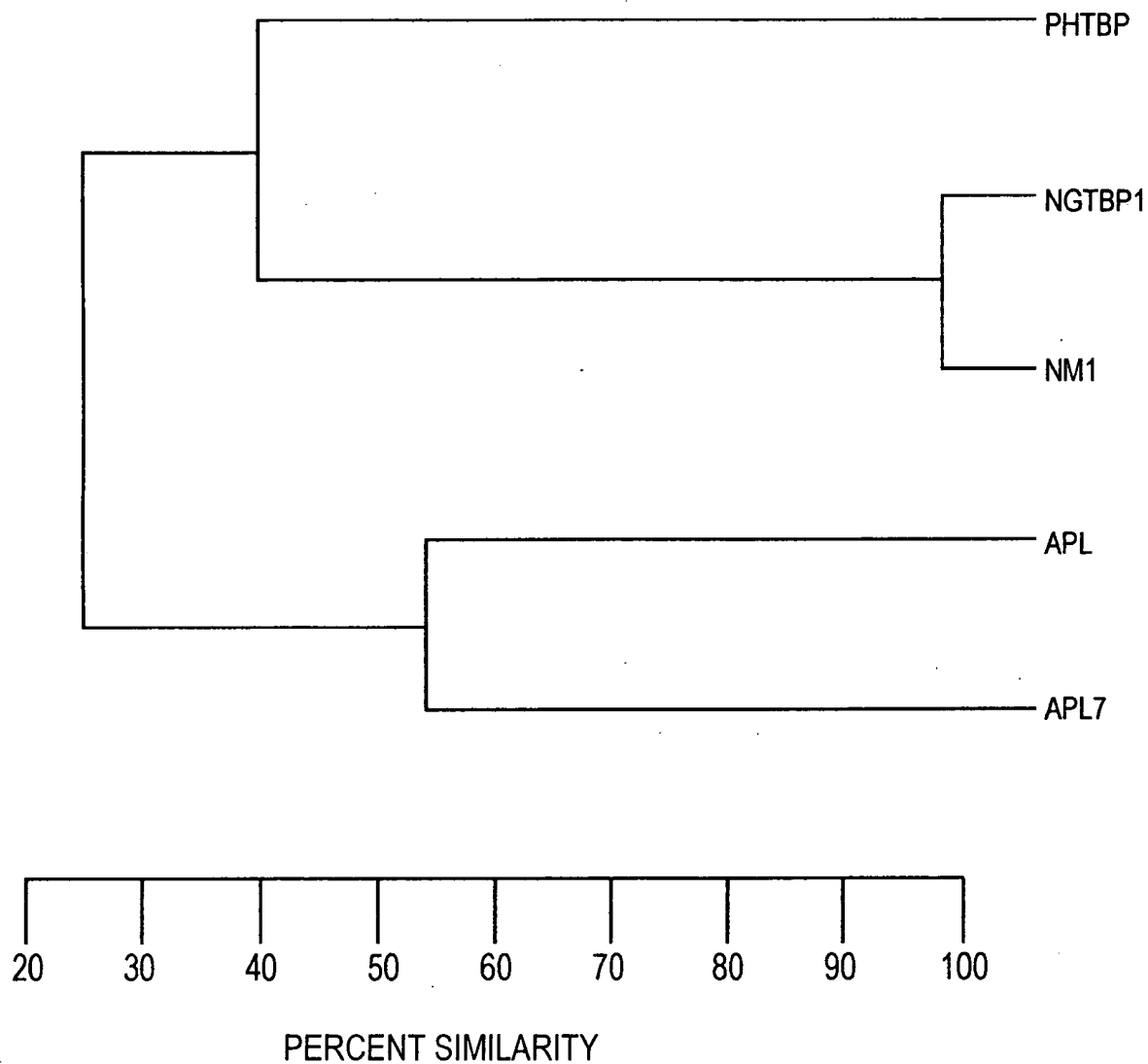


FIGURE 12

1		TonB box	
PHTBP1	DEVIVTE	22	
CIRP	ETMVVTA	12	
FEPAP	DTIVVTA	17	
FHUAP	DTITVTA	13	
FECAP	FTLSVDA	30	
	. . . *		
2			
PHTBP1	YAIRGVD---KNRVSLLDVG	121	
CIRP	VSIRGLDSS---YTLILVDG	105	
FEPAP	IDIRGMGPE---NTLILIDG	102	
FHUAP	LIIRGFAAEGSQNNYL-NG	141	
FECAP	FGIRGLNPRLTSRSTVLMVG	199	
	*** . * *		
3			
PHTBP1	IELSKGASSAEBYGSGAHGGAIGFRTKD	177	
CIRP	IEVVRGPMSSLYGSDALGGVVNIITKK	159	
FEPAP	IEVLRGPARARYGNGAAGGVVNIITKK	180	
FHUAP	AEIMRGPVSVLYGKSSPGGLLMVSKR	188	
FECAP	IDVVRGGGAVRYGPOSVGGVVNFVTRA	251	
	. . . * * *		
4			
PHTBP1	FKQTHKLNGLGLF	533	
CIRP	PETSESWELGLYY	461	
FEPAP	AETSINKBIGLEF	447	
FECAP	PSKGKQYEVGVKY	560	
FECAP	PEKARTWELGTRY	578	
 * .		

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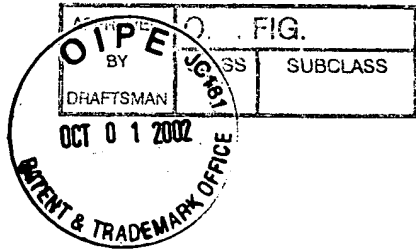
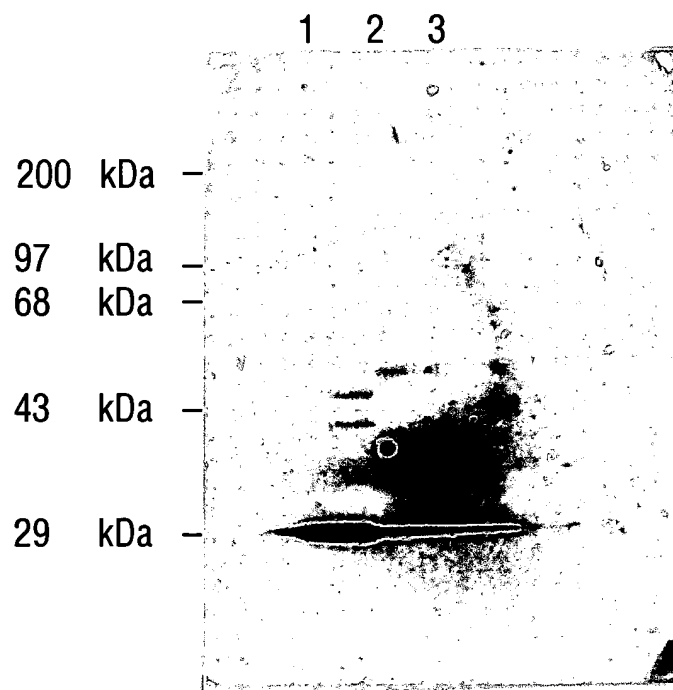


FIGURE 13



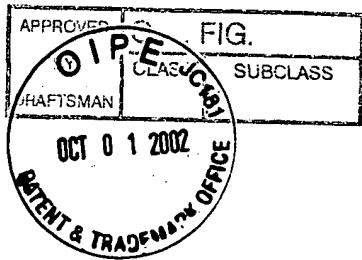
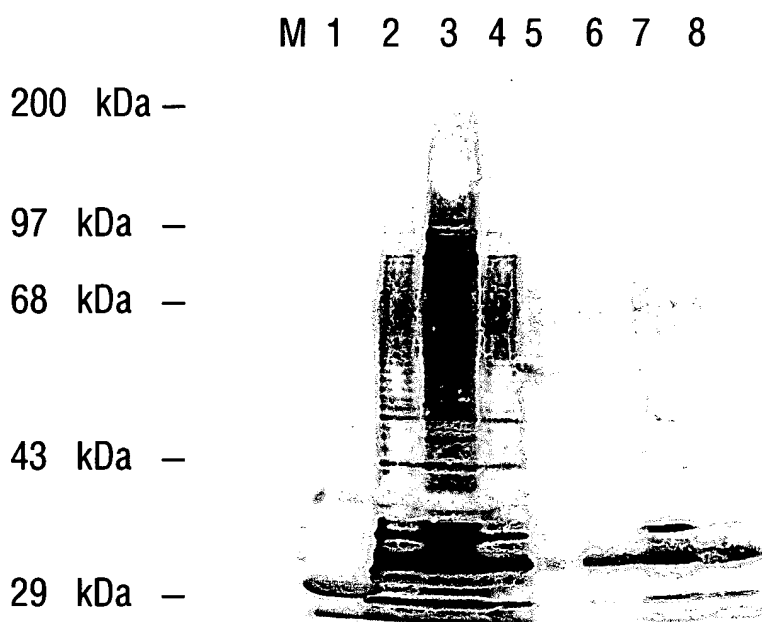


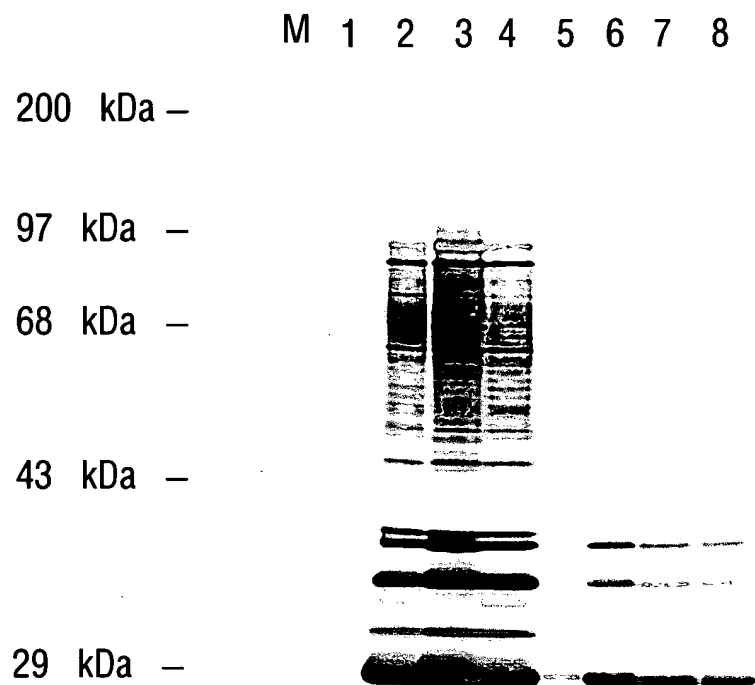
FIGURE 14



APPROVED	FIG.
BY	SUBCLASS
DR. TSMAN	



FIGURE 15



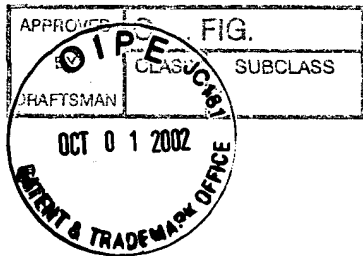


FIGURE 16

	HRP — bTf	HRP — oTf	HRP — cTf	HRP — eTf
h173 —	●	●	●	
h174 —	●	●	●	
h175 —	●	●	●	
h176 —	●	●	●	
h44 —	●	●	●	
h50 —				●

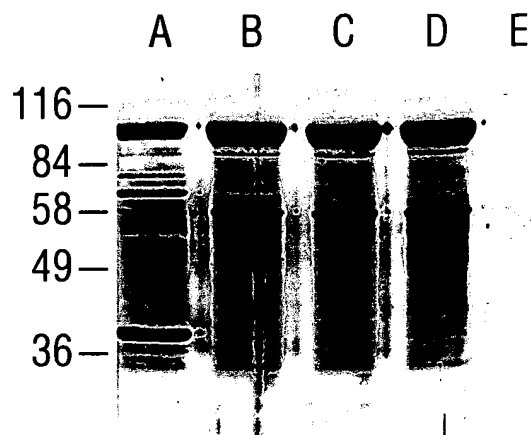
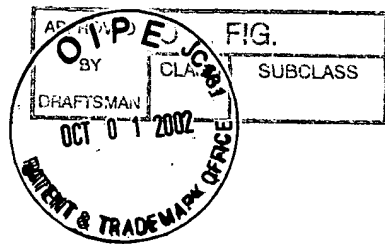


FIGURE 17A

i) h44

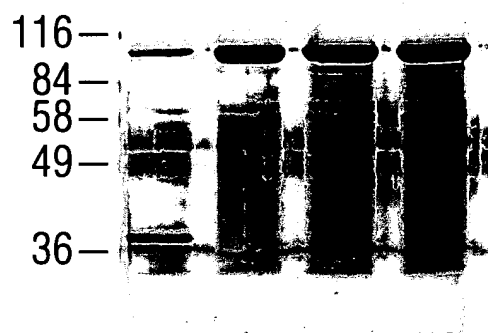


FIGURE 17B

i) h173

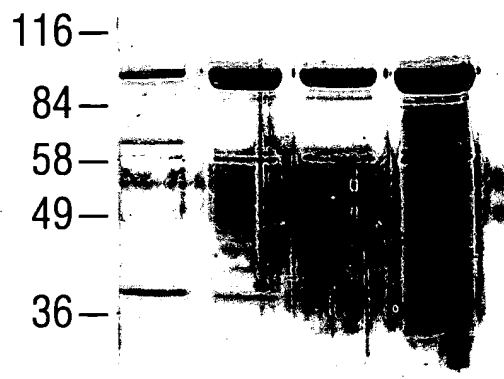


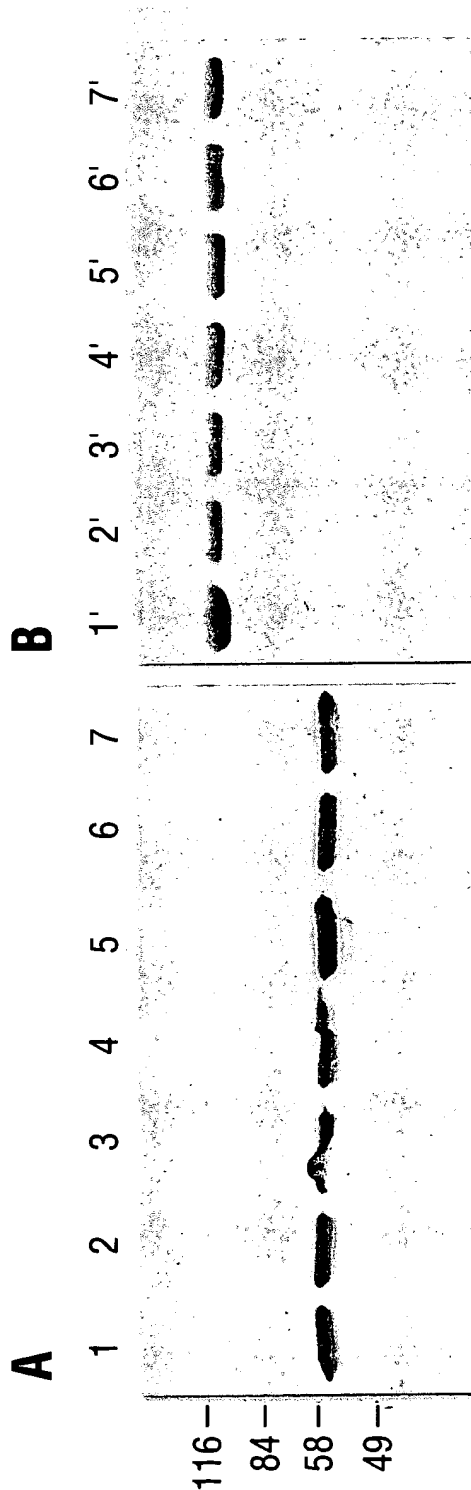
FIGURE 17C

i) h175

APPROVED	O. FIG.
CLASS	SUBCLASS



FIGURE 18B



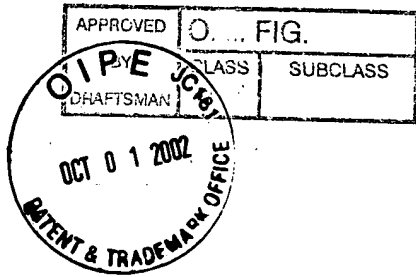


FIGURE 19A

FIGURE 19B

FIGURE 19C

HRP-bTf

Anti-Tbp1

Anti-Tbp2

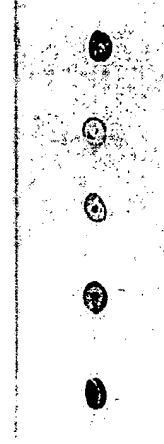
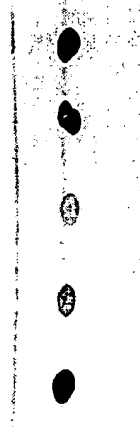
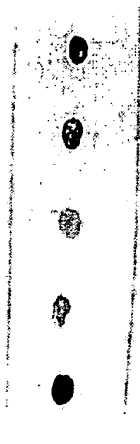
h98

h99

h100

h105

h106



A circular stamp from the Office of Intellectual Property and Economic Development (OIPED). The text "OIPED" is at the top, "CRAFTSMAN" is in the middle, and "PATENT & TRADEMARK OFFICE" is at the bottom. The date "OCT 01 2002" is stamped in the center.

Genetic map of the *tbpA* locus. The map shows a linear arrangement of genes: ORF, *rnase T*, P (promoter), *tbpB*, *tbpA*, and *fis*. Arrows indicate the direction of transcription. A scale bar at the bottom right indicates 1 kb.

FIGURE 20B

FIGURE 21

ATGATAATGAAATATCATCATTTTTCGCTATTCACCTGTTGCCTTAACAGTGTATTGCTC
 TTTCTCATTCATACGGTGTGCGACTGAAAATAAAAAAATCGAAGAAAATAACGATCTAGC
 TGTTCCTGGATGAAGTATTGTGACAGAGAGCCATTATGCTCACGAACGTCAAAACGAAGTA
 ACTGGCTTGGGGAAAGTAGTGAAAAATTATCACGAAATGAGTAAAAATCAAATTCCTTGGTA
 TTCGTGATTTAACTCGCTATGACCCTGGTATTTTCGGTGGTGGAAACAAGGTCGCGGTGCAAG
 TAGTGGCTATGCCATTTCGAGGTGTAGATAAAAACCGTGTGCTAGCTTACTTGTGATGGGCTA
 CCACAAGCGCACAGTTATCATACGCTAGGTTTCAGATGCTAATGGTGGTGCAATTAATGAGA
 TTGAGTATGAAAACATTCGTTCAATTGAGTTAAGCAAAGGAGCAAGTTCGCGGAATATGG
 CTCTGGTGCGCATGGTGGTGCCTATTGGTTCGCTACTAAAGATGCGCAGGATATTATTAA
 GAGGGGCAGCATTGGGGCTTAGATAGTAAGACCTCTTATGCCAGCAAAAATAGCCATTTTT
 TACAGTCTATCGCAGCGGCTGGTGAGGCGGGTGGTTTTGAAGCACTTGTATTGCAACTCA
 CCGACACGGTAAAGAGACCAAAATTCATTCCGAGGCAAAATAAATTAACATAATATTCGG
 CGTATAACCGGCTTTGAAAATCGCTACGACTTTACCCAAATTCGCGACAGAATGCTCCTGG
 AGGATCTCCTTTTAATTGTGGAAGATACTTGCCCAACATTAGATTGTACTCCTCGTGCAAG
 GGTAAAGTTGAACCGCGATAATTTCCAGTGAGAACATTTCCGGAATATACGCCTGAAGAG
 CGCAAACAGCTTGAGCAGATTCCTTATCGCACTGAGCAGCTCTCAGCCCAAGAATATACCG
 GTAAAGATCGCATTGCACCAAACCCCTTTAGATTACAAGAGTAATTCGTGTTTTATGAAGTT
 TGGCTATCACTTCAACTCGTCTCATTATCTTGGCGCAATCTTAGAAGATACAAAAACACGC
 TACGATATCCGTGATATGCAACGCCAGCTTACTATACAAAAGACGATATTAACCTTATCAC
 TTAGGAACATTGTTTTATGAAGGGGATAATATTTTAGATTGGCTTAGTGTTCAGCCAAGGAT
 CCTTATGGGTGCGCTATAGCCATGTGAAGTTTTTTGATGAACGTCAACACAAACGTCGT
 TTAGGATTCACCTATAAATATAAACCAGAGAATAATCGCTGGTTGGATAGCATTAAACTCA
 GTGCGGATAAAACAAGATATTGAACTATATAGCCGGCTACATCGCTTGCAATTGTAGCGATTA
 TCCTGTGGTAGATAAAAAATTGCCGCCGACTTTGGATAAATCTTGGTCTATGTATCGAACT
 GAGCGTAATAATTACCAAGAAAAGCATCGTGTCATTTAGAAATTTGATAAAGCGCTAA
 ATGCTGGTCAAGGCGTATTTAACCAAACCCACAACTGAATTTAGGGTTGGGCTTTGATCG
 ATTTAATTTCGCTTATGGATCATGGGGATATGACTGCCCAATATACCAAAGGCGGTTATACC
 AGCTACCGCGGTAGAGGGCGTTTTAGATAATCCATATATTTATCGCCGCGATCCACGCAGTA
 TTGAAACGGTATCTTTGTGTAATAATACACGCGGCGACATCTTAACTGTGAACCGCGTAA
 AATTAAAGGCGATAGCCATTTTGTAGCTTCCGCGATCTAGTGATAAGCGAGTATGTGGAT
 TTGGGATTAGGGGTGCGTTTTGATCAACATCGATTTAAATCTGATGATCCGTGGACACTTA
 GCCGAACCTTATCGAAATTGGTCTTGAATGGTGGGATTACGCTTAAACCAACAGAGTTTGT
 ATCGCTTCTTATCGCATTTCAAACGGTTTTAGAGTGCCTGCATTCTATGAACTTTATGGT
 AAACGTGATCATATTGGGCTTAAAGATAACGAATATGTGCAACGCGCGCAACGTAGCCACC
 AGTTAGAGCCAGAAAAATCGACTAATCATGAGATTGGAGTTAGCTTTAAAGGTCAATTTGG
 TTACCTTGATGTGAGCTATTTCCGTAATAACTATAAAAAATATGATTGCGACAGCATGTAAA
 AGAATAATACAAAAATCACACTGTTTCTATAACTACCATAATATTCAAGATGTAGCACTAA
 ACGGGATAAATTTAGTCGCTAAATTTGACTTACACGGTATTTTATCTATGCTGCCAGATGG
 TTTTATTCATCAGTTGCTTATAACCGTGTAAAAGTAAAAGAGCGGAAACTAACCGACTCA
 AGACTCGATAGCGTAAACGATCCTATTCTAGATGCGATTCAGCCAGCACGCTATGTGCTTG
 GATTCGGCTACGATCACCCAGAAGAAAAATGGGAATTGGCATTACTACCACCTATTCTAA
 AGCCAAAACGCGGATGAGGTGGCAGGCACACGTCAATCACGGNATACATCGCGTTGATTTA
 GGTGGCAAACGTGACCGGTTCTTGGTACACCCATGATATTACCGGTTACATCAATTATAAAA
 ACTACACCTTACGTGGAGGAATTTATAATGTGACTAATCGTAAATATTCCACTTGGGAATC
 AGTGCGCCAATCCGGTGTGAATGCAGTAAACCAAGACCGGGGTAGCAATTACACTCGATTT
 GCGCTCCGGGGAGAAATTCAGTTTAGCATTTGAAATGAAGTTTTAG

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FIGURE 22

1 M I M K Y H H F R Y S P V A L T V L F A L S H S Y G A A T E
 31 N K K I E E N N D L A V L D E V I V T E S H Y A H E R O N E
 61 V T G L G K V V K N Y H E M S K N Q I L G I R D L T R Y D P
 91 G I S V Y E O G R G A S S G Y A I R G V D K N R V S L L V D
 121 G L P Q A H S Y H T L G S D A N G G A I N E I E Y E N I R S
 151 T E L S K G A S S A E Y G S G A H G G A I G F R T K D A Q D
 181 I I K E G Q H W G L D S K T S Y A S K N S H F L Q S I A A A
 211 G E A G G F E A L V I A T H R H G K E T K I H S E A N K L K
 241 H N I R R I T G F E N R Y D F T Q I P H R M L L E D L L L I
 271 V E D T C P T L D C T P R A R V K L N R D N F P V R T F P E
 301 Y T P E E R K Q L E Q I P Y R T E Q L S A Q E Y T G K D R I
 331 A P N P L D Y K S N S V F M K F G Y H F N S S H Y L G A I L
 361 E D T K T R Y D I R D M Q T P A Y Y T K D D I N L S L R N Y
 391 V Y E G D N I L D G L V F K P R I P Y G L R Y S H V K F F D
 421 E R H H K R R L G F T Y K Y K P E N N R W L D S I K L S A D
 451 K Q D I E L Y S R L H R L H C S D Y P V V D K N C R P T L D
 481 K S W S M Y R T E R N N Y Q E K H R V I H L E F D K A L N A
 511 G Q G V F N Q T H K L N L G L G F D R F N S L M D H G D M T
 541 A Q Y T K G G Y T S Y R G R G R L D N P Y I Y R R D P R S I
 571 E T V S L C N N T R G D I L N C E P R K I K G D S H F V S F
 601 R D L V I S E Y V D L G L G V R F D Q H R F K S D D P W T L
 631 S R T Y R N W S W N G G I T L K P T E F V S L S Y R I S N G
 661 F R V P A F Y E L Y G K R D H I G L K D N E Y V Q R A Q R S
 691 H Q L E P E K S T N H E I G V S F K G Q E G Y L D V S Y F R
 721 N N Y K N M I A T A C K R I I Q K S H C F Y N Y H N I Q D V
 751 A L N G I N L V A K F D L H G I L S M L P D G F Y S S V A Y
 781 N R V K Y K E R K L T D S R L D S V N D P I L D A I Q P A R
 811 Y V L G F G Y D H P E E K W G I G I T T T Y S K A K N A D E
 841 V A G T R H H G I H R V D L G G K L T G S W Y T H D I T G Y
 871 I N Y K N Y T L R G G I Y N V T N R K Y S T W E S Y R Q S G
 901 V N A V N Q D R G S N Y T R F G A P G R N F S L A F E M K E

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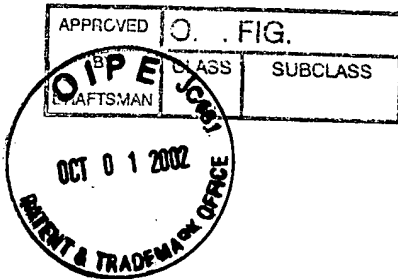


FIGURE 23

ATGTTTAAACTTAAAAGTAGTTTTGTACTGCTTAATGCGGCGCTACTTGCTGCTTGTTCCCT
CAAATGGTGGGAAGCTTTGATGTTCAATCTGCCAAAGTTGAATCTCAAACGCAAACCTACCCC
CAAAAAGCCAAGTTTACAAGATGATAATAGTAACGCAAGACGTACAGTAAGCGCTTCTGAA
ACTGAAGCTTTATTGCAGCCGGGGTTTTGGTTTTTCAGCCAAAATTCGCGTCGTAATCTCC
TTCCGCAGGGGAAGGAAGATGTAGCCCCATTGGTGATATAAAAGAGATTACTGGAGATCT
GCCAAAAATTCGTATGAAGAAGAGGTTAAAGCGTGCGGTAGTAGTGCTGATGGATTTAGC
CATACTCATGATAGAAATCATAAGTTGTATACAAGAGATTTTAATTTTGTTCGTTCCGGCT
ATGTTGTGCATTCTGGTCCAAAACCTGAAATAAAGCCTAAAGAAATTTTGAGAACAGGTGC
ACATGGGTATGTTTACTATTTAGGTATAGAGCCGCCCAAAGCAATACCTACCCAAAACTA
ACTTATAAAGGATATTGGGATTTTACTACCTATGCGGCTAAGGGGAGAGATAGTAATATTT
TTCTAATTCCCGCAGGCATCAATAGTGGCGCCATACCGGAAAATAGTCACGATATTAATGT
TGATGATTCTGAAAAACCAATGGGGCATAACAGGAGAATTTACGGCTGATTTTGCTAATAAA
ACTTTAACTGGAACATTGGTTCGTAATGGGTATGTTAGTCGTAGCAAAGAGCAAAAAATTA
CAACAATTTACGATATTGATGCGAAAATTAAGGTAATCGCTTTTCTGGTAAAGCAAACCC
AAAAAAACCGATGATCCTTATTTTTGGGAAAAGCTCCACGACACTTGAAGGTGGATTTTTT
GGTGGGGAGGCTCAAGAACTTGCCGGTAAATTCTTAGCTGATGATAAGTCGGTATTTGTTG
TTTTTGCTGGCACACGAGATGCTAAAAAGATGATAGTGAATCTGCCTTTGATGCTTTCCC
AATTAACTTAAAGATTTAAATAAATCTGAGATGGATACTTTTCGGGAATGCGACACATTTG
ATTATTAACAATAAGCAGATTCCACTTATTGCGGAAGCCACAAAAGCTTTGCCGAGATGA
AATTTGATGATTTGGTTACCCGTACTATTGATGGAAAAACGTATCGAGTTTCAGTCTGCTG
TAATAATTTAGATTATGTCAAATTTGGGATTTATAGCGAGGGAAATAATAGTGATACTGCT
CTCCAAGAATATTTAGTAGGAGAACGTACAGCTCTGGCAGATTTGCCAACAGGGACAGTAA
AATATCGAGGTACTTGGGACGGGGTAATGTACAGTAAATCTGGCTCGGCAGGGGTTGAATC
GCCAAGTAACAGCGAAAGTGGTACTCGTTCACTATTCGATGTAGATTTTGTCAATAAAAAA
ATTAATGGCAAGCTGATTGCTAATGATGGTGTGAAGAACGCCCAATGCTGACACTGGAAG
GCAATCTGAAAGGGAATGGTTTTGGAGGCACAGCCAAAACGGGCAATTCTGGTTTTAATCT
TGATCCCAAAGTACGAATGGTGGCACGGTAGGGCATATAAATACTCAATTTGAAGGGGGC
TTTTATGGCCCTAAGGCGACGGAATTAGGTGGTATTGTACAAAATACAGAAACGGATAAAG
ATAGAGTCAGTATTACATTCGGCGGAAAACGTCAAATAGAAAAATAA

FIGURE 24

1 MFKLKSSSEVLNAA LLAACSSNGGSEEDVQS
 31 AKVESQTQTTPKKPSLODDNSNARRTVSAS
 61 ETEALLQPGFGFS AKIPRRNLLPQGKEDVA
 91 PIGDIKEITGDLPKIPYEEEVKACGSSADG
 121 FSHTHDRNHKLYTRDFN FVRSGYVVHSGPK
 151 PEIKPKEILRTGAHGYVYYLGI EPPKAIP T
 181 QK LTYKGYWDF TTYAAKGRDSNIFLIPAGI
 211 NSGAIPENSHDINVDDSEKPMGHTGEETAD
 241 FANKTLTGTLVRNGYVSRSEKQKITTIYDI
 271 DAKIKGNREFSGKANPKKPMILIFGKSS TTL
 301 EGGFFGGGEAQELAGKFLADDKSVFVVFAGT
 331 RDAKKDDSES AFD A FPIKCLKDLNKSEMDTF
 361 GNATHLIINN KQIPLIAEATKSFAEMKFDD
 391 LVTRTIDGKTYRVS VCCNNLDYVKFGIYSE
 421 GNNSDTALQE YLVGER TALADLPTGT VKYR
 451 GTWDGVMYSKSGSAGVESPSNSESGTRSL F
 481 DYDEVNKKINGKL IANDGVEERPMLTLEGN
 511 LKGNNGEGGTAKTGN SGFNLDPKSTNGGTVG
 541 HINTQFEGGFEYGPKATELGGIVQNTETDKD
 571 RV SITEGGKRQIEK

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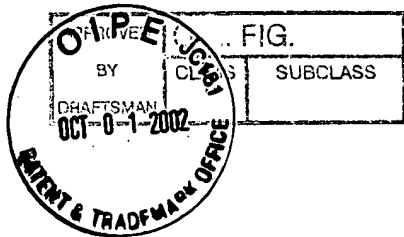


FIGURE 25

	HRP-bTf	HRP-oTf	HRP-gTf
h44 Fe +			
h44 Fe -			
h196			
h98			
h99			
h100			
h103			
h105			
h106			
h107			

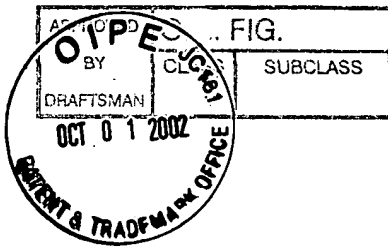


FIGURE 26A

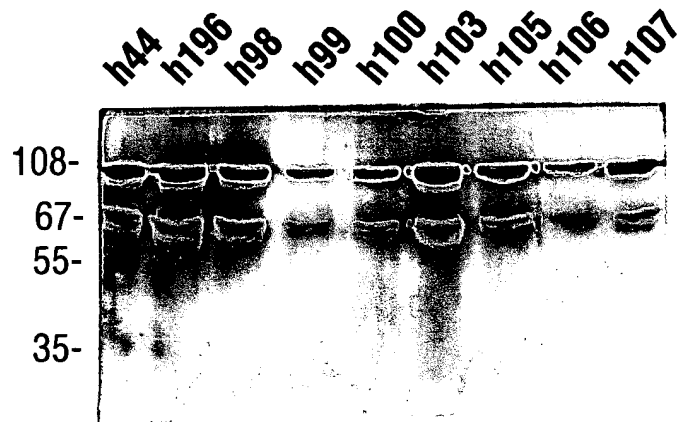


FIGURE 26B



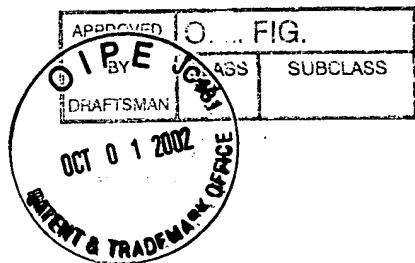
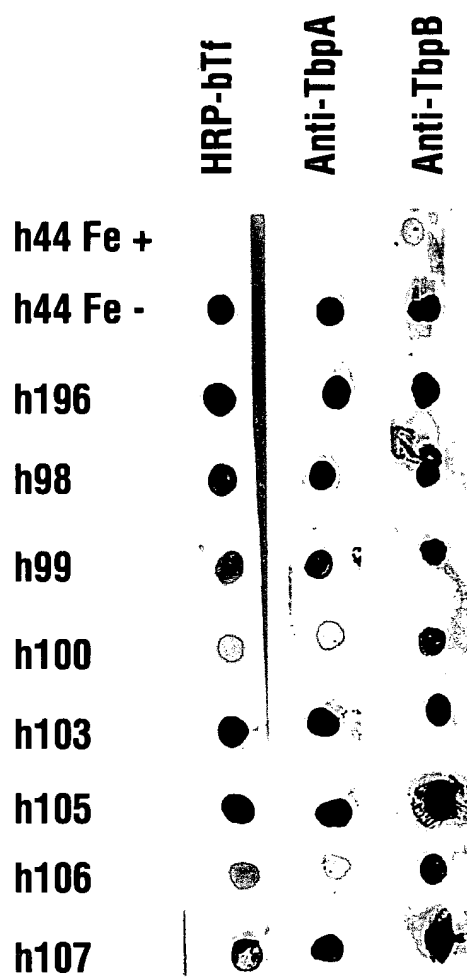


FIGURE 27



APPROVED	O. FIG.	
DRAFTSMAN	CLASS	SUBCLASS

OCT 01 2002

INVENT & TRADEMARK OFFICE

FIGURE 28A

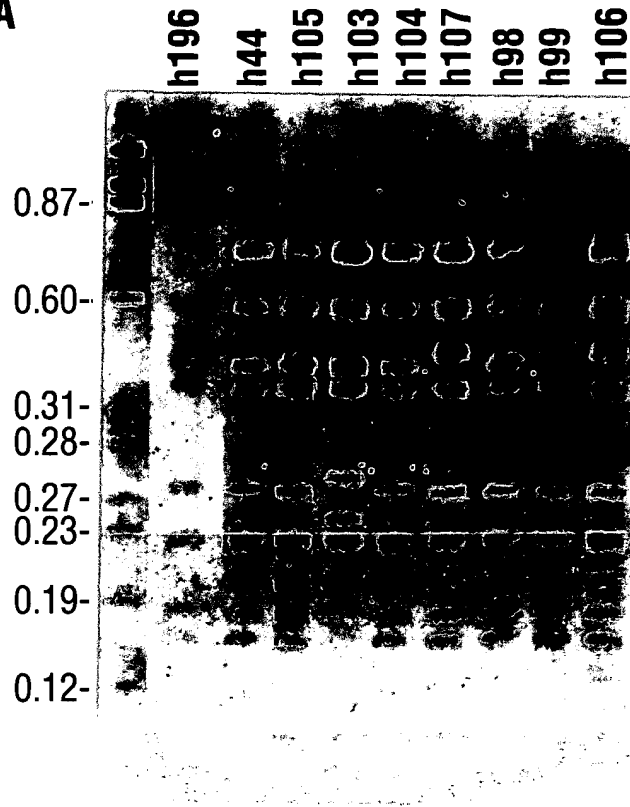
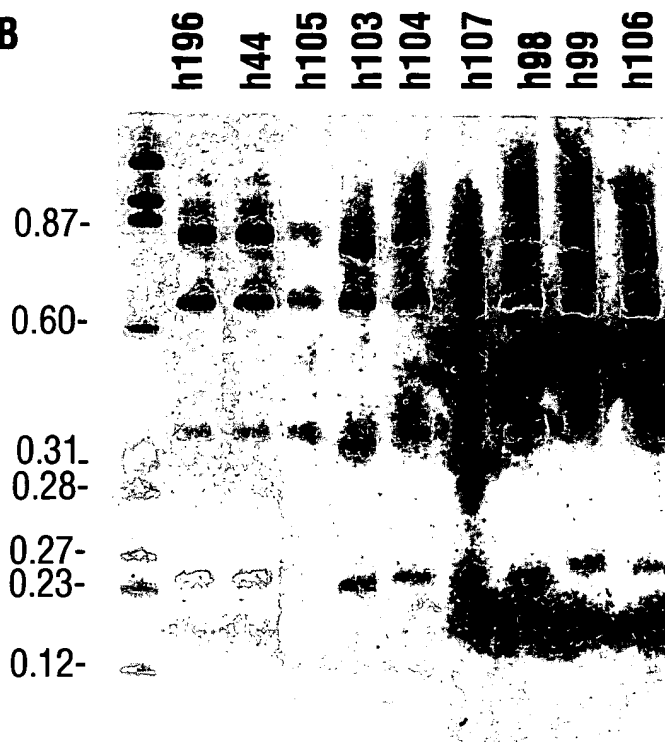


FIGURE 28B



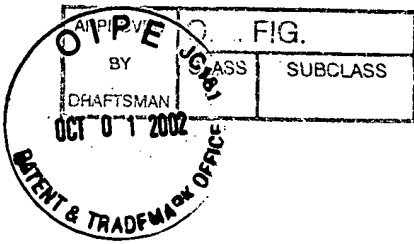


FIGURE 29A

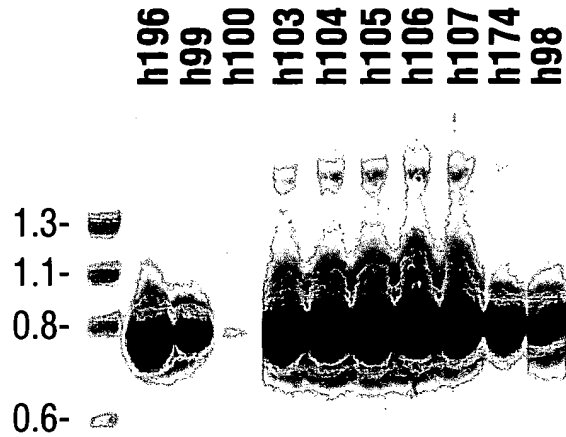


FIGURE 29B

